

CLAIMS

WHAT IS CLAIMED IS:

1. A mechanism for switching an engine from one stroke type to another stroke type comprising:

5           a first pair of pins, a first end of each of said first pair of pins in at least one of direct and indirect communication with a pressure fluid and a second end of each of said first pair of pins urged by respective ones of a first pair of  
10           springs; and

          a switching mechanism adapted to transform a rotary motion of a cam shaft to a linear motion of a valve, said switching mechanism housing said first pair of pins and being adapted to engage a  
15           two-stroke cam surface and a four-stroke cam surface of the cam shaft, whereby a change in pressure of the pressure fluid causes a movement of at least one of said first pair of pins to stop the transformation of motion from one of the two-stroke  
20           cam surface and the four-stroke cam surface to the valve.

2. The mechanism according to Claim 1, wherein said switching mechanism further comprises a rocker assembly  
25           having a rocker arm operatively engaging the valve, a first follower arm operatively engaging the four-stroke cam surface, and a second rocker arm operatively engaging the two-stroke cam surface, wherein one of said first pair of pins is caused to engage and disengage the  
30           first follower arm and the other of said first pair of pins is caused to engage and disengage the second

follower arm.

3. The mechanism according to Claim 2, wherein the rocker assembly includes a pressure fluid chamber  
5 disposed between said first pair of pins.

4. The mechanism according to Claim 3, wherein one of the first pair of springs is disposed on a side of one of said first pair of pins opposite the pressure  
10 fluid chamber and the other of the first pair of springs is disposed on a side of the other of said first pair of pins opposite the pressure fluid chamber.

5. The mechanism according to Claim 4, including a  
15 second pair of pins, one of the second pair of pins disposed adjacent one of said first pair of pins and the other of the second pair of pins disposed adjacent the other of said first pair of pins, wherein the second pair of pins ensures proper alignment of the first pair  
20 of pins for engagement and disengagement of the first follower arm and the second follower arm.

6. The mechanism according to Claim 1, wherein said switching mechanism further comprises a tappet assembly  
25 including an outer tappet operatively engaging the two-stroke cam surface, an inner tappet operatively engaging the four-stroke cam surface, and a valve plunger operatively engaging the valve.

7. The mechanism according to Claim 6, wherein said first pair of pins is caused to engage the outer tappet with the valve plunger and disengage the inner tappet from the valve plunger to operate in a two-stroke mode,  
5 and said first pair of pins is caused to engage the inner tappet with the valve plunger and disengage the outer tappet from the valve plunger to operate in a four-stroke mode.

10 8. The mechanism according to Claim 7, wherein the first pair of springs is disposed between said first pair of pins.

9. The mechanism according to Claim 8, wherein the  
15 pressure fluid urges said first pair of pins radially inwardly of the inner tappet against the force of the first pair of springs to engage the inner tappet and the valve plunger and disengage the outer tappet and the valve plunger to operate in the four-stroke mode.

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10. The mechanism according to Claim 6, including an inner tappet return spring to urge the inner tappet into engagement with the four-stroke cam surface.

25 11. The mechanism according to Claim 6, including an outer tappet return spring to urge the outer tappet into engagement with the two-stroke cam surface.

12. The mechanism according to Claim 6, wherein the  
30 outer tappet engages two two-stroke cam surfaces.

13. A switching mechanism for switching an engine from one stroke type to another stroke type comprising:

a rocker assembly having a rocker arm  
operatively engaging a valve, a first follower arm  
5 operatively engaging a four-stroke cam surface of a  
cam shaft, and a second rocker arm operatively  
engaging a two-stroke cam surface of the cam shaft,  
said rocker assembly adapted to transform a rotary  
motion of the cam shaft to a linear motion of the  
10 valve; and

a first pair of pins disposed in said rocker  
assembly, a first end of each of said first pair of  
pins in communication with a pressure fluid and a  
second end of each of said first pair of pins urged  
15 by a respective one of a pair of springs, whereby a  
change in pressure of the pressure fluid causes a  
movement of at least one of said first pair of pins  
to stop the transformation of motion from one of  
the two-stroke cam surface and the four-stroke cam  
20 surface to the valve.

14. The switching mechanism according to Claim 13,  
wherein one of said first pair of pins is caused to  
engage and disengage the first follower arm and the  
25 other of said first pair of pins is caused to engage and  
disengage the second follower arm.

15. The switching mechanism according to Claim 14,  
wherein the rocker assembly includes a pressure fluid  
30 chamber disposed between said first pair of pins.

16. The switching mechanism according to Claim 14,  
including a second pair of pins, one of the second pair  
of pins disposed adjacent one of said first pair of pins  
5 and the other of the second pair of pins disposed  
adjacent the other of said first pair of pins, wherein  
the second pair of pins ensures proper alignment of the  
first pair of pins for engagement and disengagement of  
the first follower arm and the second follower arm.

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17. A switching mechanism for switching an engine  
from one stroke type to another stroke type comprising:

a tappet assembly including an outer tappet  
operatively engaging a two-stroke cam surface of a  
15 cam shaft, an inner tappet operatively engaging a  
four-stroke cam surface of the cam shaft, and a  
valve plunger operatively engaging a valve, said  
tappet assembly adapted to transform a rotary  
motion of the cam shaft to a linear motion of the  
20 valve; and

a pair of pins disposed in said tappet  
assembly, a first end of each of said pins in  
communication with a pressure fluid and a second  
end of each of said pins urged by respective ones  
25 of a pair of springs, whereby a change in pressure  
of the pressure fluid causes a movement of at least  
one of said pins to stop the transformation of  
motion from one of the two-stroke cam surface and  
the four-stroke cam surface to the valve.

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18. The mechanism according to Claim 17, wherein  
said pins are caused to engage the outer tappet with the  
valve plunger and disengage the inner tappet from the  
valve plunger to operate in a two-stroke mode, and said  
5 pins are caused to engage the inner tappet with the  
valve plunger and disengage the outer tappet from the  
valve plunger to operate in a four-stroke mode.

19. The mechanism according to Claim 17, wherein  
10 the springs are disposed between said pins.

20. The mechanism according to Claim 18, wherein  
the pressure fluid urges said pins radially inwardly  
against the force of the springs to engage the inner  
15 tappet and the valve plunger and disengage the outer  
tappet and the valve plunger to operate in the four-  
stroke mode.

21. A switching mechanism for switching an engine from one stroke type to another stroke type comprising:

5 a rocker assembly having a cavity formed therein, the cavity of said rocker assembly having a first piston and a shuttle pin disposed therein, the first piston and the shuttle pin being reciprocable between a first position and a second position by means of hydraulic pressure, the first piston and the shuttle pin urged towards the first position against the means of hydraulic pressure by a first spring;

10 a first follower arm adapted to follow a first cam surface of a cam shaft;

15 a second follower arm adapted to follow a second cam surface of a cam shaft, wherein said first follower arm is connected to operatively engage a valve stem in the engine when the shuttle pin is in the first position and the second follower arm is connected to operatively engage the valve stem in the engine when the shuttle pin is in the second position; and

20 a hydraulic lash adjustment device disposed between the valve stem and the rocker assembly to compensate for clearances therebetween.

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22. The switching mechanism according to Claim 21, wherein said hydraulic lash adjustment device includes a second piston abutting the valve stem and a second spring urging the piston towards the valve stem.

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23. The switching mechanism according to Claim 21,  
wherein said hydraulic lash adjustment device is  
selectively engagable and disengagable.